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United States Department of Agriculture,

FORESTRY DIVISION,

CIRCULAR NO. 5.

ARBOR DAY PLANTING IN EASTERN STATES.

The following Circular has been prepared to answer inquiries from School Superintendents and other officials as well as private individuals who are interested in tree planting on Arbor Day.

J. M. RUSK,
Secretary.

SIR :—I have the honor to submit herewith a circular giving brief instructions on selection of trees and manner of planting for Arbor Day purposes, to answer inquiries from school superintendents and others interested in Arbor Day.

Respectfully,

J. M. RUSK,
Secretary.

B. E. FERNOW,
Chief of Forestry Division.

Introductory:—Arbor Days in the Eastern States as a rule contemplate the planting of shade and ornamental trees mainly for the sake of creating a sentiment and interest in tree planting and eventually in forest culture.

The following suggestions do not refer to the educational features of Arbor Day, but are meant to give in the briefest manner such general advice in regard to the selection of trees for the occasion and to the manipulation of planting, as may aid teachers, pupils and others to perform the practical work of Arbor Day with reasonable hope of success.

Time of Planting.—The day set for Arbor Day and the weather on that day may not always be the best for planting. Its fitness for an out-door celebration should govern the choice, while the planting may be done at a more suitable season. Spring, before the buds open (February or May) is as rule the best time for transplanting—although with care it can be done all the year round—and a murky or cloudy day is preferable to a sunny one for that operation.

Choice of Trees.—

1. *General Considerations.*—Trees for school grounds and yards, along roadsides and streets, must be such as are least liable to suffer from injuries; they should be compact and symmetrical in shape, free from objec-

tionable habits, such as bad odors, root-sprouting, frequent dropping of parts, etc., and from insect pests, and if planted for shade, should have a broad crown and a dense foliage, budding early in the spring and retaining leaves long into the fall. Absence of skillful hands at tree-planting on Arbor Days would also limit the selection to those which are transplanted easily and require the least care.

Trees native to the region in which the planting is done usually have more promise of success and are generally less costly than exotics. Trees *from well managed nurseries* are preferable to those grown in the forest, because their root-system is better prepared for transplanting. Rapidly growing trees, although giving shade soonest, are mostly short lived and become soonest unsightly.

2. *Size*.—Although as a rule small plants have a better promise of success, other considerations recommend the choice of larger sizes for roadside and ornamental planting. Trees of any size can be successfully transplanted, but in proportion to the size grows the difficulty, the amount of work and the care necessary. As a rule the *largest size should not exceed 2 to 3 inches* in diameter at the base and 10 to 15 feet in height. Those one-half that size will probably make better growth, because less of their root-system will be curtailed in taking them up for transplanting.

3. *Diagnosis of a tree suitable for transplanting*:—a. An abundance of fibrous roots. Not the turnip-like main or tap-root but the little fibres sustain the life of a tree. See that there are plenty of them, compactly grown within a small compass, and that they are not stripped of their bark or torn at their ends or dried up.

b. A normal form and well proportioned development of shaft and crown. The shaft should be clean and straight, neither thick set and short, nor thread-like and over elongated, but gradually tapering and strong enough to hold up its head without support. The normal crown is characterized by vigorous full sized leaves, or else by a large number of thick and full buds; it covers the main stem one-third to one-half its length, with a symmetric spread evenly branched, and has only one leader, of moderate length.

The length and vigor of the last year's shoots, number and thickness of buds, and the appearance of the bark afford means of judging the healthy constitution of the tree.

c. The position from which the tree came has some influence on its further development. Trees from the forest have generally a wide spreading root-system, which is difficult to take up and transplant. Those which have grown in the shade of the forest as a rule do not start easily in the open sunlight; those from cool north sides are apt to sicken when placed on hot exposures and vice versa. A healthy tree from poor soil transferred into better conditions will show itself grateful by vigorous development.

Treatment before transplanting.—Transplanting is at best a forcible operation, and injury to the roots, although it may be small, is almost unavoidable. The roots are the life of the tree, and need, therefore, the most attention. In taking up a tree for transplanting the greatest care must be exercised to secure as much of the root-system intact as possible, especially of the small fibrous roots.

a. *Never allow roots to become dry, from the time of taking up the tree until it is transplanted.*—A healthy looking tree may have the certainty of death in it if the root fibrils are dried out. To prevent drying during transportation, cover the roots with moist straw or moss or bags, or leave on them as much soil of the original bed as possible. At the place where the tree is to be planted, if the planting cannot be done at once, "heel in" the roots, i. e., cover them and part of the lower stem with fresh earth, or place the tree in the plant hole, throwing several spadeful of earth on the roots.

b. Pruning roots and branches is almost always necessary, but must be done with great care, especially as to root pruning. The *cutting at the roots should be as little as possible*, only removing with a clean sharp cut the bruised and broken parts. Extra long tap-roots may be cut away, but all the small fibers should be preserved. The cutting at the top is done to bring crown and root into proportion; the more loss at the root-system has been experienced the more need of reducing the crown system. Larger trees, therefore, require mostly severe pruning, especially on poor soils; yet if there be fibrous roots enough to sustain great evaporation from the crown, the less cut the better. With large trees severe pruning is less dangerous than too little. A clean cut as close as possible to the stem or remaining branch will facilitate the healing of the wound. No stumps should be left (except with conifers, which suffer but little pruning). Shortening of the end shoots to $\frac{1}{2}$ or $\frac{2}{3}$ of their

length may be done a little above a bud which is to take the lead. As a rule, the pruning for symmetry should have been done a year or so before transplanting, but may be done a year after.

Method in planting a tree.—1. Holes are best made before the trees are brought to the ground. They should be a little deeper than the depth of the root system, but twice as large around as seems necessary, to facilitate penetration of rains and development of rootlets through the loosened soil. Place the top soil, which is better (being richer in easily assimilated plant food) to one side, the raw soil from the bottom to the other side; in filling back bring the richer soil to the bottom. If it be practicable, improve a heavy loamy soil by adding to and mixing with it looser sandy soil, or a loose poor soil by enriching it with loam or compost. Keep all stones out of the bottom; they may be used above the roots, or better, on the surface. Providing proper drainage is the best means of improving ground for tree planting. Use no manure except as a top dressing.

2. Planting is best done by two or three persons. A, who manipulates the tree is the planter and responsible for the results; B and C do the spading under his direction. A, places the tree in the hole, to ascertain whether this is of proper size; a board or stick laid across the hole aids in judging the depth. Trees should not be set deeper than they stood before, except in loose, poor soil. *More trees are killed by too deep planting than the reverse.* If the root-system is developed sideways but not centrally, as if often the case, a hill is raised in the hole to fill out the hollow space in the root-system, and the earth of the hill is patted down with the spade. When the hole is in proper order, A, holds the tree perpendicularly in the middle of the hole, with the side bearing the fullest branches toward the south, or southwest, for better protection of the shaft against the sun. B and C spread the roots into a natural position then fill in the soil, using the good soil first—small spadefuls deliberately thrown over the roots in all directions—while A, by a slight shaking and pumping up and down of the stem, aids the earth in settling around the rootlets. *A close contact of the soil with the rootlets, is the secret of success in planting.* Only fine mellow soil, not too moist, and free from stones, will permit such close adjustment to the rootlets, which should also be aided by hand and fingers filling in every crevice. A, while setting the tree, must exercise care to keep it in proper position and perpendicular, until the soil is packed so as to keep the tree in place; then B and C rapidly fill the holes, A treading down the soil firmly after a sufficient quantity is filled in, finishing off a little above the general level to allow for settling, and finally placing the stones or any mulch around the stem.

Watering.—The practice of using water while planting can hardly be said to be a good one, unless the water is very carefully applied with a “rose” after the soil is well filled in and packed around the fibrous roots. Especially with a soil which has a tendency to clog, there is great danger of an uneven distribution and settling, with consequent empty spaces between the roots. *More trees are probably killed by too much water in transplanting than by too little.* Water after the transplanting, (and perhaps before the last shovels of earth, are filled in) especially if the soil was dry, is useful and should be applied during the hot season, choosing the late afternoon or evening for applying it.

After care.—Any mulch of waste material, hay, straw, or litter, wood shavings or chips, sawdust, or even stones simply placed around the foot of the tree, is of excellent service in checking evaporation.

Keeping the ground free from weeds and grass, and preventing it from baking, by occasional hoeing and raking, is advisable. To prevent the trees from being swayed by the wind, if of larger size, they should be staked firmly; a loose post is worse than none. The tying should be so done as not to cut or injure the tree; a tree-box insures more safety against accidents. With the development of the crown it becomes necessary to trim it, so as to carry the top above reach. Trees are not benefitted by being used as hitching posts, or climbing poles, or other frolic.

Summarizing the elements of success in tree-planting, they are:

1. Trees suitable to soil and surrounding conditions;
2. A well developed root-system, kept in living condition;
3. Wide holes and mellow soil;
4. Firm packing of soil around the roots.

Choice of kinds.—Leaving out conifers—which require more careful handling and better situations than are as a rule to be had on occasions like that in view—there are over hundred indigenous species to choose from for planting on the Atlantic side; of these 30 to 40 might deserve attention for Arbor Day tree-planting, according to climate, soil and situation, or object. It is best to limit the choice for this occasion to trees of recognized merit native to your locality; opportunities will vary the choice. It is only possible here to name the following selections, which admit of a wide application in the Atlantic States.

Three trees to be planted where nothing else will grow; easily transplanted, growing rapidly, but short-lived, liable to injuries, root-sprouting, soon scraggy looking unless specially attended:

Silver Maple.
(*Acer dasycarpum*)

Carolina Poplar.
(*Populus monilifera*)

Box Elder.
(*Negundo accroides*)

Four trees, among the best for street and lawn:

Sugar Maple.
(*Acer saccharinum*)

Red Maple.
(*Acer rubrum*)

Linden.
(*Tilia Americana*)

Elm.
(*Ulmus Americana*)

Five trees desirable for lawn and yard:

Tulip Tree.
(*Liriodendron tulipifera*)

Red Oak.
(*Quercus rubra*)

Willow Oak.
(*Quercus phellos*)

Black Cherry.
(*Prunus serotina*)

Sweet Gum.
(*Liquidambar styraciflua*)

Six trees suitable for special positions:

Sycamore.
(*Platanus occidentalis*)

Black Birch.
(*Betula lenta*)

Ash.
(*Fraxinus Americana*)

Black Walnut.
(*Juglans nigra*)

Chestnut.
(*Castanea vesca*)

Beech.
(*Fagus ferruginea*)

Two foreigners of note:

Horse Chestnut. (*Aesculus Hippocastanum*) and Paulownia (*Paulownia imperialis*.)

